

Applicants : Scott E. Post et al.  
Appln. No. : 10/775,262  
Page : 2

### REMARKS

There are no amendments presented in this response. Claims 1-23 remain present in this application. Applicants respectfully request reconsideration and allowance of the present application.

In the latest Office Action, claims 1, 2, 4-9, 11, 12 and 14-20 were again rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,275,330 to Isaacs et al. Applicants submit that the claims are not anticipated by the Isaacs et al. patent for the reasons discussed below.

In the rejection, the Examiner has taken the position that the “drilling” and “plating” manufacturing steps claims are process limitations in a device claim and thus are only considered to the extent to which they impact the structure of the device. The Examiner further stated that how the solder joint is formed is a process limitation in a product claim.

The Isaacs et al. patent discloses a solder ball connection between an electronic module 44 and a printed circuit board substrate 10 that elevates the height of solder joints with the use of solder balls. The solder ball connection includes solder balls 40 aligned with solder paste deposits 33 on vias 16. Upon heating, the solder paste deposits 33 melt and reflow. The solder balls 40 have a higher melting temperature which results in the solder balls 40 providing a standoff height between the electronic module 44 and the printed circuit board 10.

In contrast, Applicants’ claim 1 recites an electronic package including a circuit board having a substrate and circuitry, a surface mount device having a contact terminal, and a mounting pad formed on the circuit board. The electronic package includes a plurality of vias extending into the circuit board and the mounting pad. Each of the vias have an opening extending therein. The electronic package further includes a solder joint connecting the contact terminal of the surface mount device to the mounting pad on the circuit board. The solder joint extends at least partially into the opening in each of the plurality of vias to support the arrangement of the surface mount device on the circuit. The solder joint is formed from a solder paste that is reshaped on the mounting pad such that a portion of the solder paste reflows into the vias and a portion of the solder paste contacts the contact terminal. Claim 11

Applicants : Scott E. Post et al.  
Appln. No. : 10/775,262  
Page : 3

similarly is directed to an electronic package in which a solder joint extends at least partially into an opening in a via to form a solder column that supports the arrangement of the surface mount device on the circuit board.

In order to anticipate a claim, the prior art reference must teach each and every limitation of the claim. Nowhere does the Isaacs et al. patent disclose an electronic package having in combination one or a plurality of vias extending into a circuit board and mounting pad, each via having an opening, and a solder joint connecting the contact terminal of a surface mount device to the mounting pad on the circuit board, wherein the solder joint extends at least partially into the opening in each of the plurality of vias to support the arrangement of the surface mount device on the circuit board, and wherein the solder joint is formed from a solder paste that is reshaped on the mounting pad such that a portion of the solder paste reflows into the via(s) and a portion of the solder paste contacts the contact terminal.

Instead, the Isaacs et al. patent discloses a solder ball connection that employs a solder ball 40 disposed within a solder paste, which provides a standoff height achieved by using solder balls 40. It should be appreciated that Applicants' electronic package does not have a controlled height standoff and does not employ preformed solder balls that do not melt during reflow to create a controlled standoff height. Instead, the electronic package employs a solder paste which is reheated and reflows on the mounting pad such that the solder flows into the via(s) and a portion of the solder paste contacts the contact terminal. As a result of using a solder paste without solder balls, the device can be tightly pulled toward the circuit board, while at the same time, realizing vertical column(s) within the via(s) and its resultant advantages which lead to increased solder joint life.

Accordingly, the Isaacs et al. patent does not disclose each and every limitation of claims 1 and 11 and therefore does not anticipate claims 1, 2, 4-9, 11, 12 and 14-20. Accordingly, the rejection to claims 1, 2, 4-9, 11, 12 and 14-20 under 35 U.S.C. §102(b) in view of Isaacs et al. should therefore be withdrawn, which action is respectfully requested.

Claims 3 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Isaacs et al. in view of U.S. Patent No. 5,489,750 to Sakemi et al., and claims 10 and 21 were

Applicants : Scott E. Post et al.  
Appln. No. : 10/775,262  
Page : 4

rejected under 35 U.S.C. §103(a) as being unpatentable over Isaacs et al. in view of U.S. Patent No. 6,083,834 to Chang et al.

Applicants submit that claims 3, 10, 13 and 21 should likewise be allowable for the reasons discussed above with respect to the rejection of independent claims 1 and 11. Additionally, Applicants note that neither of the Sakemi et al. and Chang et al. patents teaches or suggests (or otherwise makeup for the deficiencies in the Isaacs et al. patent) the features set forth in independent claims 1 and 11. Specifically, none of the cited patents teach or suggest an electronic package having a solder joint formed of a solder paste that reflows into the via(s), as recited in the claims.

Accordingly, Applicants submit that the rejection of claims 3, 10, 13 and 21 under 35 U.S.C. §103(a) should likewise be withdrawn, which action is respectfully solicited.

Applicants previously added new claims 22 and 23 which recite that the solder joint is formed from a conductive adhesive which is present in the via or vias. The Examiner has not formally rejected claims 22 and 23 or indicated that these claims are allowed and, thus, the finality of this Office Action must be withdrawn. Applicants submit that none of the cited patents to Isaacs et al., Sakemi et al. and Chang et al. teaches or suggests an electronic package having a solder joint formed of a conductive adhesive, as recited in independent claims 22 and 23, and therefore submit that claims 22 and 23 should likewise be allowable over the art of record.

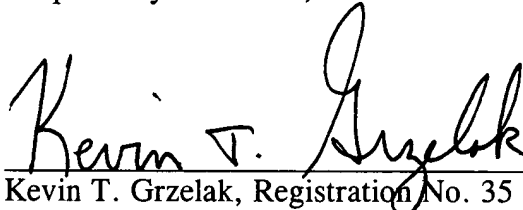
By way of the foregoing discussion, Applicants have demonstrated that the claims are not anticipated by Isaacs et al., and would not have been rendered obvious in view of Isaacs et al. in combination with either of Sakemi et al. and Chang et al., and the rejections of the claims under 35 U.S.C. §103(a) should therefore be withdrawn.

Finally, Applicants previously submitted a Supplemental Information Disclosure Statement disclosing a European Search Report and references cited therein, dated May 11, 2005. Applicants repeat their request that the Examiner note consideration of the references cited in the European Search Report on the form PTO-1449.

Applicants : Scott E. Post et al.  
Appln. No. : 10/775,262  
Page : 5

In view of the above amendments and remarks, it is submitted that claims 1-23 define patentable subject matter and are in condition for allowance, which action is respectfully solicited. If the Examiner has any questions regarding the patentability of any of the claims, the Examiner is encouraged to contact Applicants' undersigned attorney at his convenience.

Respectfully submitted,

A handwritten signature in black ink, reading "Kevin T. Grzelak". The signature is written in a cursive style with a large, stylized "K" and "G".

Kevin T. Grzelak, Registration No. 35 169  
Price, Heneveld, Cooper, Dewitt & Litton, LLP  
695 Kenmoor, S.E.  
Post Office Box 2567  
Grand Rapids, Michigan 49501  
(616) 949-9610

December 5, 2005  
Date

KTG/jrb